



Montgomery County Fire and Rescue Service

POST INCIDENT ANALYSIS

Third Alarm House Fire
7105 45th Street
Bethesda, Maryland

Incident Date: September 6, 2013



Submitted by
Battalion Chief Monte Fitch

Incident Overview

On Friday, September 6, 2013 at 1642 hours Box 6-10 was struck for a reported house fire to the rear of 4405 Leland Street. Units arrived on 45th Street to find a working fire in a large single family dwelling undergoing renovation with exposures on both sides. The main fire building was a total loss and fire extended to the Bravo exposure causing moderate damage before the fire was brought under control.

Upon arrival, Battalion 702 encountered black smoke from the rear of 7105 45TH Street, the corrected address was announced and a circle check was completed. No flames were evident from the Alpha side. The Charlie side was accessed by walking between the Delta wall and a construction dumpster 2' away. From the Charlie side a large volume of fire was evident on two floors but ventilation was limited as the windows and doors were intact.

As the crew of Paramedic Engine 706 stretched a 1 ¾" line to the Charlie side, the floor to ceiling windows on the Delta side failed, followed quickly by a set of 10' x 16' sliding doors on the Charlie side. The sudden influx of air caused this post flashover fire to quickly engulf the entire house.

The house was in the process of being renovated and had no drywall covering any of the framed walls. This fact, coupled with the large ventilation openings throughout the structure from the window and door failures, created a 5,400 square foot torch. In addition to the rapidly spreading fire, crews had to overcome a limited water supply due to low volume from the hydrants on 45th Street (see "Water Supply" below). Overall, 2800' of 4" supply line was laid to augment the low volume of water being supplied by the initial hydrants. The low volume of water in addition to the initial selection of a small hand line, prevented crews from being able to flow the necessary volume of water to quickly control and extinguish the fire.

The fire extended to exposure Bravo, a large occupied single family house, via radiant heat and ignition of pine trees between the two structures. Crews worked aggressively in the exposure and were able to hold their positions and extinguish the fire. The fire in this structure was limited to the third floor in the Charlie quadrant which included the attic space behind the knee walls.

Once the water supply issues were resolved and the aerials were positioned, master streams were used to quickly contain and control the fire in the house of origin. At the 22 minute mark the fire was under control and Personnel Accountability Reports (PARs) were conducted.

The incident eventually grew to three alarms, although the bulk of the work was completed with the first two alarms. The decision to make all operations

defensive was decided immediately and communicated to all personnel via 7-Charlie. The fact that this incident was primarily defensive does not diminish the strategic and tactical lessons that can be derived from it.

The weather was sunny and the temperature was in the low 80's with light winds (7mph) out of the NE.

Resources on the Incident

Box Alarm

Paramedic Engine 706	Tower 751	Ambulance 741Charlie
Paramedic Engine 707	Tower 719	Battalion Chief 702
Engine 750	Rescue Squad 742	Battalion Chief 701
Engine 720		
Engine 711		

Rapid Intervention Dispatch (RID)

Truck 706 (from 10)	Medic 741Delta
Rescue Squad 42	

Task Force

Engine 754	Tower 723
Engine 705	

Fill out Second Alarm

Paramedic Engine 719	Tower 718	Medic 701
Paramedic Engine 718		Air Unit 716
		Canteen 733

Box Alarm

Paramedic Engine 701	Tower 703	Medic 742
Paramedic Engine 716	Truck 834	Battalion Chief 704
Engine 702		
Paramedic Engine 723		

An origin and cause examination by the MCFRS Fire and Explosive Investigators determined the cause of this fire to be electrical in nature.

There were no injuries to fire and rescue personnel or residents.



** The time stamp on all of the pictures is 2 minutes fast





Fire Venting from the Delta side 3:40 from dispatch / 1:35 from initial line being stretched

Bushnell

09-06-2013 16:48:50



Fully involved

**7 minutes
from dispatch**

**3 minutes
from the first
line being
stretched**

Bushnell

09-06-2013 16:50:56

Link to a video of the fire: <http://youtu.be/iZKlqHD1dYo>



Bravo Exposure

Construction/Site Layout

7105 45th Street was a large single family home (SFH) on just under a quarter acre lot. The original structure had been completely razed and a 5,400 square foot (not including basement) SFH was being constructed in an open floor plan modern design.

A portion of the house was constructed with 2" x 6" studs for the exterior walls and several of the interior walls. Other parts of the house had 2" x 8" studs for exterior walls. The Alpha and Delta walls were largely constructed of 10' and 12' tall windows and the Charlie side wall had 16' x 12' sliding glass doors. The Charlie wall also had two 3 ½" x 4" steel columns. An interior bearing wall closest to the Charlie side contained four 3 ½" x 4" steel columns. Two steel beams ran from the Charlie side wall to two of the steel columns in the first floor ceiling.

Between the Alpha and Bravo quadrants was an open elevator shaft. Across from the shaftway, between the Charlie and Delta quadrants, were stacked stairs to the basement and second floor.

On the roof of the Charlie quadrant, was a concentrated load of five pallets of 2" x 24" x 24" stone pavers that were being stored for patio installation. Particularly during construction, always consider temporary or unexpected loads.

There was no drywall in the structure.

Access to the structure was made difficult by a chain link fence that ran around the Alpha side along the street and had a plywood gate at the Alpha/Bravo corner of the lot. A five foot wooden fence ran the length of the yard on the Bravo, Charlie and Delta sides. The fence on the Bravo side of the house was eight feet from the house and eight feet from the Bravo exposure.

The rear yard of the house had a silt fence that contained the runoff from the master streams which became a problem for personnel working in the Charlie Division. On the Delta side of the house a 9' x 30' construction dumpster sat only two feet away from the house and two feet from the wooden fence. Trees and power lines along the street complicated aerial access to the structure.



Interior steel columns



The Delta side viewed from the Charlie side



The Charlie/Delta corner



The Bravo side and rear yard viewed from the Alpha side.

Water Supply

Initial water supply was established by Paramedic Engine 706 laying 4" hose from the hydrant at 4411 45th street and pulling past the house. Paramedic Engine 707 picked up this hydrant and supplied Paramedic Engine 706. After several minutes of operating, this hydrant was unable to keep up with the demand. Post fire testing found this hydrant was only able to supply 765 gallons per minute (GPM) and when other hydrants were opened, the GPM of the initial hydrant decreased.

A secondary water supply was established by Engine 720 laying out from 4336 Leland Street. Engine 711 picked up this hydrant and supplied Engine 720. This hydrant was able to supply between 825 and 1100 GPM dependent upon whether other hydrants were being used and the amount of water being discharged from those hydrants.

Task Force units were requested to lay lines to the Charlie side of the structure on 44th Street. Engine 705 initiated water supply from the hydrant at 7110 44th Street. This hydrant had adequate capacity and flow.

Due to the water supply issue with the first hydrant and the need to supply attack lines in the Bravo exposure, Paramedic Engine 719 laid out from 7113 Willow Lane and Paramedic Engine 718 picked up the hydrant. This hydrant had significant restrictions, flowing 500 GPM with no other hydrants flowing, and dropping to 450 GPM when other hydrants were in use. Paramedic Engine 719 was the supply pumper for Aerial Tower 719 and the interior attack lines in the exposure building. To augment water supply, Paramedic Engine 718 hand-jacked over 800' of supply line to the hydrant at 4312 Willow Lane with the assistance of Montgomery County Police Department officers and citizens; at which point there was sufficient water supply. Additionally, Paramedic Engine 716 reverse laid from Paramedic Engine 719 to the hydrant at 46th Street and Willow Lane but the water was not needed.

Paramedic Engine 723 laid a supply line from Wisconsin Avenue to Paramedic Engine 707 to augment water supply.

After the incident testing of the hydrants found:

1. The primary hydrant at 4411 45TH Street had a maximum flow of 765 GPM when no other hydrants in the area were opened. The hydrant experienced 10-15 pounds per square inch (PSI) drops in residual pressure if the adjacent hydrants were also opened.
2. The secondary hydrant at 4336 Leland Street had a maximum flow of ~800 GPM
3. The third hydrant used was at 7110 44TH Street and had a flow of 1100 GPM.
4. The fourth hydrant used at 7113 Willow Lane was the primary water supply for interior operations in the Bravo exposure and had a maximum flow of 500 GPM with 0 PSI residual pressure.





Paramedic Engine 707 on the hydrant at 4411 45TH Street
supplying Paramedic Engine 706

Communications

This was a very fast moving incident for the first 25 minutes creating a large amount of radio traffic. Several communications to Command were missed as a result of multiple users keying the radio at the same time. Several radios “honked” when attempting to transmit, including the radio in the Command Post.

Communications were complicated at times by personnel sending messages or directions without identifying their unit or function. Communications were further complicated when units failed to communicate through their respective divisions/groups. These complications were distracting and confusing to Command and all units operating on the fire ground.

Pre-Emergency Planning

The homes in this area are often remodeled. Pre-emergency planning is not generally conducted on single family homes. There have not been any previous incidents in the area to discover any deficiencies in the water supply. It is recommended that all personnel regularly familiarize themselves with the community in their first due which should include a walk through of all new construction to identify issues relevant to the fire and rescue service.

On-site operations

Battalion Chief 702 arrived first at 1643 hours and found a 5,400 square foot single family home under construction with black smoke coming from the rear of the house.

Battalion Chief 702 was met by a neighbor who reported that the construction personnel had all left the scene and that the house was not being occupied by the residents during construction. The neighbor also advised that a pool was located on the top floor of the structure but that information was later found to be incorrect. Battalion Chief 702 performed a circle check of the structure to check on what was actually on fire, the size of the house, and the amount of fire involvement. On the Delta side of the structure smoke and fire were visible through a 5' x 12' floor to ceiling glass panel. There was a chimney on the Charlie side of the structure and three 12' x 16' sliding glass doors behind which was black smoke and a large volume of fire that was rolling into the doors like waves. All doors and windows were intact and closed upon arrival.

Battalion Chief 702 gave an incident on scene report (IOSR) that there was a working fire in the rear of the structure and announced the corrected address as 7105 45th Street. Paramedic Engine 706 was directed to advance a line around to the Charlie side where the bulk of the fire was located and initiate extinguishment from the exterior. The second line was directed to go to the Bravo exposure to prevent extension into the exposure.

The initial incident priorities were to knock down the fire in the initial structure and to prevent extension into the Bravo exposure.

Paramedic Engine 706 dropped a forward lay of 4" hose at 4411 45th street and pulled past the dispatched address. When the engine stopped to lay out the officer got out of the apparatus and ran down the street to the Charlie side of the house. The crew of Paramedic Engine 706 advanced a 1 ¾" hand line to the Charlie side of the structure. Once the line was in place the fire vented out all of the sliding glass doors on the Charlie side and the large windows on the Delta side of the house. The fire was no longer ventilation limited and rapidly extended throughout the house, venting from every window and door within three minutes of units arriving on the scene.

Paramedic Engine 707 was directed to pull a line to the Bravo side of the house to protect the exposure. Paramedic Engine 707 used a 2" line, which was not adequate for the volume of fire. Engine 720 was instructed to place a BlitzFire line at the Alpha/Delta corner. The line was placed at the Charlie/Delta side but Command was not notified of the change.

Command then had the driver of Paramedic Engine 706 place a BlitzFire at the Alpha/Delta corner. Paramedic Engine 707 was directed to operate the BlitzFire with the intent to operate both the exposure line and BlitzFire. This did not occur but the instruction was not clearly communicated to the crew.

Engine 750 was then utilized to augment the line protecting the exposure by pulling a 2 ½". Engine 750 did pull the line but failed to flow water continuously and had to be ordered multiple times to open the hand line and flow water onto the burning structure.

Timeline

Time	Time from dispatch	Action
1643 Hours	:36	BC702 on scene w/ IOSR
	1:05	BC702 w/ Command and corrected address; order for PE706 to take line to the Charlie side
	1:45	Task Force requested
	1:50	Command ordered exterior operations only
1645 Hours		PE706 advancing line to Charlie side
	2:30	PE706 began fire attack on Charlie side
	2:32	Command verbalized "no occupancy issue" – based upon information from neighbor
	2:36	Order for PE707 to advance line to protect exposure by positioning on Alpha/Bravo corner and extinguishing fire
	2:58	Order for PE707 to relocate and not block access for truck
1646 Hours		Fire venting from Delta side
	3:08	RIT established with E750
	3:15	Order for E720 to advance BlitzFire to Alpha/Delta corner. E1 from PE 706 set up BlitzFire
	3:40	Progress report requested from PE706 due to lack of knock down or reported fire not knocked down (depending what was meant here)
	3:50	PE706 requested BlitzFire

	3:58	PE707 was preparing to open BlitzFire on Alpha/Delta corner; Command directed PE707 to man BlitzFire while simultaneously operating the hand line to protect the exposure and knock down fire from the Bravo side
1648 Hours		Heavy fire throughout structure
	4:35	Requested Task Force units E754 & E705 to establish water supply on 44 th Street and advance lines to Charlie side exposures. 12 minutes for E754 to complete E705's water supply
	4:56	Designated PE706 as Charlie Division with AT751. Charlie Division ended up with E720 and E711 but the Division OIC never instructed the extra units to report to command or assigned them other tasks.
	5:20	Division Charlie reports: "no sheet rock, collapse, have hand line, will have BlitzFire set up momentarily"
	5:50	AT751 – "not able to place truck in service. Did not position in front of structure, left truck on Leland"; AT719 asked Command for the best location to place truck. Command was unable to give the best location due to the pace of events and not able to see access. AT719 was able to get into good position, but was still limited by trees and wires
	8:01	Command directed E720 to get water to AT719 on Alpha side.
	8:55	Several communications to Command. This is when the exposure house was catching fire. Command should have directed E711 and RS741 to establish a position in the exposure to extinguish any fire spread and flow water into affected house.
	8:57	E754 did not follow the order of establishing water to the Charlie side
	9:44	PE719 requested to supply water to AT719
	9:50	Face to face request for E750 to flow their line
	10:05	EMS701 calling Command by name and without identifying him or her self– requesting a box alarm for exposure house
	10:30	T706 began flowing. First significant knock on fire was from T706 ladder pipe from Charlie exposure driveway.
	11:01	PE719 & PE718 assigned to Bravo exposure - attic. (There was confusion about the correct Divisions – should have been Division 3) Command could not see the number of floors because of trees and failed to catch the report from PE719 that they were actually on the 3 rd floor; even though they said it twice. No other units made this clarification including the command officer that took over on the division. This would have led to confusion if conditions worsened or there was a Mayday

	11:01	PE718 has water at 45 th & Willow – supplying AT719 & PE718's supply lines. PE718 driver recruited MCPD and civilians to assistance to hand jack over 800' of supply line to get a good water source since their initial hydrant was unable to supply adequate water
	11:05	PE719 advances leader line from their own engine to Bravo exposure
	11:50	Ordered AT719 to Bravo exposure creating some confusion, crew of AT719 was in aerial to flow water on fire so unable to go to work in exposure. This caused a delay in PE719 being able to flow their line
	12:27	Again orders E750 to flow water into the fire building
	13:12	E705 requesting orders for what to do with line and told to stand by. Command did not get back to them for several minutes – too long of delay
	14:50	E754 states they can pick up E705's line
	15:27	PE719 reiterated 3 rd floor – not 2 nd floor
	15:50	PE719 requesting Command to contact PE719 driver and charge line
	16:20	RIG for Bravo exposure established with RS742 and AT751
	16:50	Charlie Division reporting significant knock on fire on the Charlie side
	17:20	EMS701 advised command of “conditions worsening” and a need to “commit more resources” (to the Bravo exposure)
	17:57	Assigned Division 1 in the Bravo exposure with AT723 as supervisor and E750
	18:58	E705 requesting E754 to pick up hydrant on 44 th This doesn't match earlier information
	19:07	Division officer in Bravo exposure reporting making progress on fire in Bravo exposure
	19:42	EMS701 makes recommendation for master stream on the Bravo exposure. Fire was limited to a small portion of the attic and exterior and crews were operating inside
	20:11	E705 again requesting orders. Delay in Command getting to them
	20:23	Bravo exposure Division 1 reporting no smoke or fire. Split crews between this Division and the (which) line between initial fire building and exposure
	21:20	E705 to Bravo exposure, top floor
	21:30	Knock on fire in Bravo exposure
	22:00	PAR's for units operating
1706 Hours	22:19	Bulk of fire knocked on Charlie side

Staging

The task force units were called to the scene to establish additional water supply early on. The second alarm was staged on Leland Street, then brought in to the scene to augment water supply and for additional manpower to fulfill operational needs. The third alarm was dispatched to stage at Bethesda Chevy Chase High School. Staging was handled by Battalion Chief 701 on 7-Delta.

Accountability

Accountability was handled through Division assignments. Several units were never assigned to a division and never requested assignment. Several units were assigned tasks but failed to complete those tasks and to operate where assigned.

Personnel Accountability Reports was conducted at the 22 minute mark

Investigations

The cause of this fire was determined to be from electrical equipment left on.

Lessons Learned

- When the initial hose line is not large enough to deploy sufficient water for the volume of fire, crews must then regroup and advance the proper size line.
- When four person staffing exists and the unit is not operating on the interior, a single engine crew should be expected to deploy the larger line themselves.
- In defensive operations personnel must be aware of the collapse zone and operate outside of the collapse zone while still operating close enough so that hose lines are effective.
- Crews must be assigned to threatened exposures as soon as possible.
- The first due ladder companies must position as close as possible to the fire
- Apparatus must not position in a manner that impedes aerials access to the building
- The initial line must be large enough to extinguish, control, and/or contain the fire. Big fire = big water. 1 ¾" and 2" lines are not appropriate for exterior operations if a large volume of fire must be knocked down
- Division and Group Supervisors need to manage personnel and operations by recognizing when personnel not assigned to their division are operating in their division. Equally as important, personnel must have the crew discipline to operate where they are assigned.
- At large incidents where units are operating on the exterior, personnel should expect to perform multiple tasks such as operating a master stream and a hose line simultaneously.

- In defensive operations, initial lines must go between the burned and unburned to protect exposures and unburned areas while also extinguishing the fire
- Minimize risk by recognizing, deciding and announcing defensive operations.
- Effective fire ground communications remain an issue;
 - All units must identify themselves when making a transmission
 - Communications must go through the Division/Group leader unless the transmission is of an emergency nature or the distance from that leader is too far to give him/her the information
 - Transmissions must be short, necessary, and to the point
- Orders given must be followed. If it is not possible to follow those orders then the reasons must be clearly communicated to Command or whoever gave the order.
- Crews must be able to be creative, multi-task, and anticipate and respond to the needs of the incident
- When operations are exterior, crews must flow water onto the fire to extinguish it and to protect the exposure
- Many units anticipated fire ground needs and placed themselves in positions to make a difference. It is critical to maintain situational awareness, predict changes, and build contingency plans.
- Apparatus needs to be clearly identified. In this incident, units attempting to lay additional supply lines were unable to properly identify apparatus that they were to supply. Placards or clearly identifying markers need to be utilized to identify reserve apparatus.



Lines must be out of collapse zone but in position to protect exposures and extinguish the fire. This line is too far away.

View of Side Delta



Excellent positioning by Truck 706 – Access to side Charlie from 44th Street



Helicopter Image – Side Alpha on image Left